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*Flood Risk and
Sustainable
Drainage Systems
(SuDS)*

**Oxford Local Plan
2040**

**BACKGROUND
PAPER 9a**

Flood Risk and Sustainable Drainage Systems (SuDS)

SA Objective: To build resilience to climate change, including reducing risks from overheating, flooding and the resulting detriment to well-being, the economy and the environment.

SEA theme: Water, climatic factors and human health.

1. Introduction

1.1 The city of Oxford is located at the confluence of two rivers, the Thames and the Cherwell, as well as numerous watercourses. The risk from river flooding is one source of flooding that has the potential to impact development in Oxford, with other sources including groundwater, surface water and sewer flooding. The ongoing impact of climate change, including projected wetter winters and increased incidences of intense rainfall events, is likely to exacerbate these risks in the future, with a variety of negative consequences for property, economy and ecosystems as well as human health.

1.2 This background paper sets out the existing context of flood risk in the city and how the Local Plan 2040 addresses this topic through its policies. This also includes the approach to Sustainable Drainage Systems (SuDS). The paper sets out the wider policy context, before moving on to discuss the existing situation in Oxford and likely situation without a new Local Plan. The remainder of the discussion then focuses on the key elements of the Local Plan 2040 policy approach and how the Council has approached formulation of these policies.

2. Policy Framework

The Flood and Water Management Act, 2010

2.1 This piece of legislation requires better management of flood risk, creates safeguards against rises in surface water drainage discharges and protects water supplies for consumers. It gave a new responsibility to the Environment Agency for developing a National Flood and Coastal Risk Management Strategy, and established upper tier local authorities (in our case Oxfordshire County Council) as Lead Local Flood Authorities and provided them with a range of duties.

National Planning Policy Framework (NPPF)

2.2 Paragraphs 159-169¹ of the NPPF set out the policy for planning for development in flood risk areas. It requires a sequential approach to development: sites should not be allocated, or permitted, if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. It also requires an exception test for proposed development in areas of flood risk: this requires proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

possible reduce flood risk overall. Paragraphs 166-168 focus primarily on planning applications and paragraph 169 provides that sustainable drainage systems should be incorporated into major planning applications unless there is clear evidence this would be inappropriate. Local Planning Authorities need to have appropriate policies in place on sustainable drainage systems.

2.3 The NPPF (paragraph 120) recognises that some undeveloped land can perform many functions, including flood risk mitigation. The NPPF also requires that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies. The NPPF states that the SFRA will be the basis for determining the sequential approach to development. This is important as applicants need not apply the sequential test again on sites allocated in the development plan through the sequential test.

2.4 The NPPF was recently updated and published in September 2023, however amendments to the previous version, published in July 2021 contained a few minor amendments to flooding policy. This included specifically referencing that improvements to green infrastructure and other forms of infrastructure can provide opportunities to reduce the causes and impacts of flooding as well as explicitly stating that as well as development being resistant and resilient to flooding, in the event of a flood, buildings should be able to be quickly brought back into use without significant refurbishment. Additionally, a separate Annex 3 has been provided which classifies flood risk vulnerability.

National Planning Practice Guidance (PPG)

2.5 The PPG was significantly updated in August 2022, to bring the guidance up to date and in line with the latest policy position on flood risk introduced in the updates to the NPPF in 2018 and 2021. In the revised guidance, paragraph 078 refers to a table² which sets out the definition of the different flood zones:

- Flood Zone 1 has the **lowest** probability of flooding
- Flood Zone 2 has a **medium** probability of flooding
- Flood Zone 3 has a **high** probability of flooding
- Flood Zone 3b is the **functional flood plain** and this zone comprises land where water has to flow or be stored in times of flood.

2.6 The key difference made in 2022, is that the definition of the functional flood plain (Flood Zone 3b) has changed from an annual probability of 1 in 20 (5%) or greater in any year to 1 in 30 (3.3%) or greater in any year.

2.7 The PPG on Flood Risk and Coastal Change provides more detailed guidance as to the application of the sequential and exception tests in the context of plan-making and planning applications. It also provides additional information on the “sequential approach to the

² <https://www.gov.uk/guidance/flood-risk-and-coastal-change#para78>

location of the development” and provides some over-arching guidance relating to “taking flood risk into account in preparing plans”.

Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026

2.8 The Flood and Coastal Erosion Risk Management (FCERM) Strategy for England was published in 2020, with an initial 1-year action plan showing the actions needed, published in May 2021. The Environment Agency has recognised that a longer-term view is now needed to implement the strategy and to address this, they have worked with partners to develop a roadmap³. The roadmap contains practical actions out to 2026, which once completed will help to implement the strategy’s 2100 vision. These include actions such as taking forward projects and programmes that will pioneer innovative ways of boosting flood and coastal resilience and make a difference to their local communities, as well as identifying practical ways in which flood and coastal investments can contribute to wider priorities, including local nature recovery, carbon reductions and more integrated water solutions that help with both flood and drought resilience.

Thames Catchment Flood Management Plan, Environment Agency, 2009

2.9 Oxford is one of the areas identified in this Thames Catchment Flood Management Plan⁴ as containing a heavily populated floodplain. At the time of the plan’s publication, 4,000 properties in Oxford had a 1% risk of flooding (from rivers). By 2100, it was predicted for this number to increase to 4,660 properties. The flood risk is concentrated in known locations. Large scale interventions will be expensive and difficult to build and maintain. Adaptation of the places at risk and of people’s behaviour has the potential to manage risk. However, this will take time and will not always meet the expectations of the communities at risk.

Our Catchment Plan, Thames Water, 2018

2.10 Thames Water produced a plan⁵ which includes an analysis of the causes of sewer flooding and pollution in the Oxford catchment. These include heavier and more intense rainfall events happening more often; deterioration within the sewerage network and blockages caused by fat, oil and grease deposits, resulting in flooding and operational issues; loss of local river flood plains; and increasing river flooding. The report notes that the foul sewers were not designed to cope with surface water. For example, in the Grandpont area, the deterioration of some of the sewers within their network has allowed groundwater into the foul sewers. At Abingdon Road, flooding from surface water sewers has also occurred as a result of high river levels and / or restriction of the outfalls due to vegetation growth.

2.11 The Our Oxford catchment plan is currently at the Options Appraisal stage. Thames Water are recommending an intervention comprising of short, medium and long term

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1080740/FCERM-Strategy-Roadmap-to-2026-FINAL.pdf

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/293903/Thames_Catchment_Flood_Management_Plan.pdf

⁵ <https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-reports/2018-catchment-plans/oxford-catchment-plan.pdf>

measures. Short term activities will include their ongoing work to improve the operation of their network and their response to problems as they occur. Medium term activities will include the refurbishment of their local sewerage network to reduce pollution and foul sewer flooding. Long term activities include the review and refinement of their catchment approach based on the experience gained, and outcomes achieved from the short and medium term interventions.

Oxford City Council “Our Strategy” 2020-24

2.12 The City Council’s “Our Strategy”⁶ document sets out the importance of working with partners to deliver improved flood defences and managing the increased risks of flooding in order to help the city become more resilient to climate change.

Oxford Local Plan 2036 Policies on Flood Risk

2.13 The Oxford Local Plan 2036 is the current development plan for the city and it contains a number of policies that relate to flood risk. In particular, Policies RE3 and RE4 set out the City Council’s approach to flood risk, sustainable drainage, and also provide the policy approach in relation to water management at some of Oxford’s important nature conservation sites. Policy RE3 includes strict provisions as to what development will be granted planning permission in Flood Zone 3b. Any proposal must meet all of the criteria in this policy and must be for water-compatible uses or essential infrastructure; or, where it is on previously developed land, it must represent an improvement of the existing situation in terms of flood risk.

2.14 Policy RE3 was informed by the Flood Risk and Sequential Test of Sites Background Paper⁷. In line with the associated guidance in the PPG, when developing site allocation policies, the sequential test was applied if any of the potential sites were outside of Flood Zone 1. Before allocating sites in higher risk flood zones, it was demonstrated that there were no reasonable alternative sites available in areas with a lower probability of flooding that would have been appropriate to the type of development or land use proposed. Any proposals for the development of sites in Flood Zone 3a that incorporated ‘more vulnerable’ uses such as housing also required the exception test. In the case of Oxford, where previously developed sites in Flood Zone 3b were proposed, an exception test was also required. Paragraphs 1.21 to 1.59 of our Statement of Common Ground with the Environment Agency⁸ provide more detail as to how the sequential and exception tests are applied in Oxford.

2.15 The Flood Risk and Sequential Test of Sites Background Paper set out the individual capacities of sites within each Flood Zone and demonstrated that Oxford had insufficient capacity to accommodate its housing need within lower risk flood zones. Consequently, development sites were allocated within higher risk flood zones applying the sequential

⁶ https://www.oxford.gov.uk/downloads/file/7528/oxford_city_council_our_strategy_2020-24

⁷ https://www.oxford.gov.uk/downloads/file/5558/bgp9_-_flood_risk_and_sequential_test_of_sites

⁸ https://www.oxford.gov.uk/downloads/file/5577/com4_-_statement_of_common_ground_-_environment_agency

test. These sites must be accompanied by a site-specific flood risk assessment when planning permission is sought.

Oxford City Sustainable Drainage Design and Evaluation Guide

2.16 In 2010 the Flood and Water Management Act proposed that sustainable drainage systems (SuDS) should be used on most development and this was confirmed in a ministerial statement in 2015 introducing the 'non statutory technical standards' for SuDS. The evaluation guide to sustainable drainage⁹ was published in 2018 and provides a link between the design of SuDS with the evaluation requirements. The design and evaluation guide promotes the idea of integrating SuDS into the fabric of development using the available landscape spaces as well as the construction profile of buildings. This approach provides more interesting surroundings, cost benefits, and simplified future maintenance. This guide provides a background context for SuDS designs, taking into account the landscape character and local geology and provides advice on what type of SuDS is most suitable in Lye Valley; a Site of Special Scientific Interest (SSSI) with a unique nature, where special consideration to the type of SuDS must be given.

3. Current situation

3.1 In Oxford there are major technical obstacles which mean any solutions to flooding will be expensive, provide different levels of protection and not benefit everyone in the affected communities. Proposals can be brought forward that will reduce the risk to many people, but major flood defences are not a realistic option in the foreseeable future. The most sustainable way of managing flood risk in Oxford will be through a Flood Risk Management Strategy. As set out in the introduction, flooding occurs from a number of sources including groundwater, surface water, river, and sewage flooding. Each will be looked at in turn to present a current picture of what is happening in the city.

Fluvial Flooding

3.2 Fluvial (or river) flooding occurs when a river bursts its banks and water spills out onto the surrounding land. This type of flooding is caused by heavy rain. Fluvial flooding is the primary source of flood risk in Oxford in terms of flooding extent, the number of properties at risk and historical flood damages. Oxford is located at the confluence of the River Thames and River Cherwell, and is at risk from both watercourses independently, as well as concurrently in large flood events. As can be seen from Figure 1 below, large parts of Oxford are at risk from this type of flooding.

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https://www.oxford.gov.uk/downloads/download/985/oxford_city_sustainable_drainage_design_and_evaluation_guide

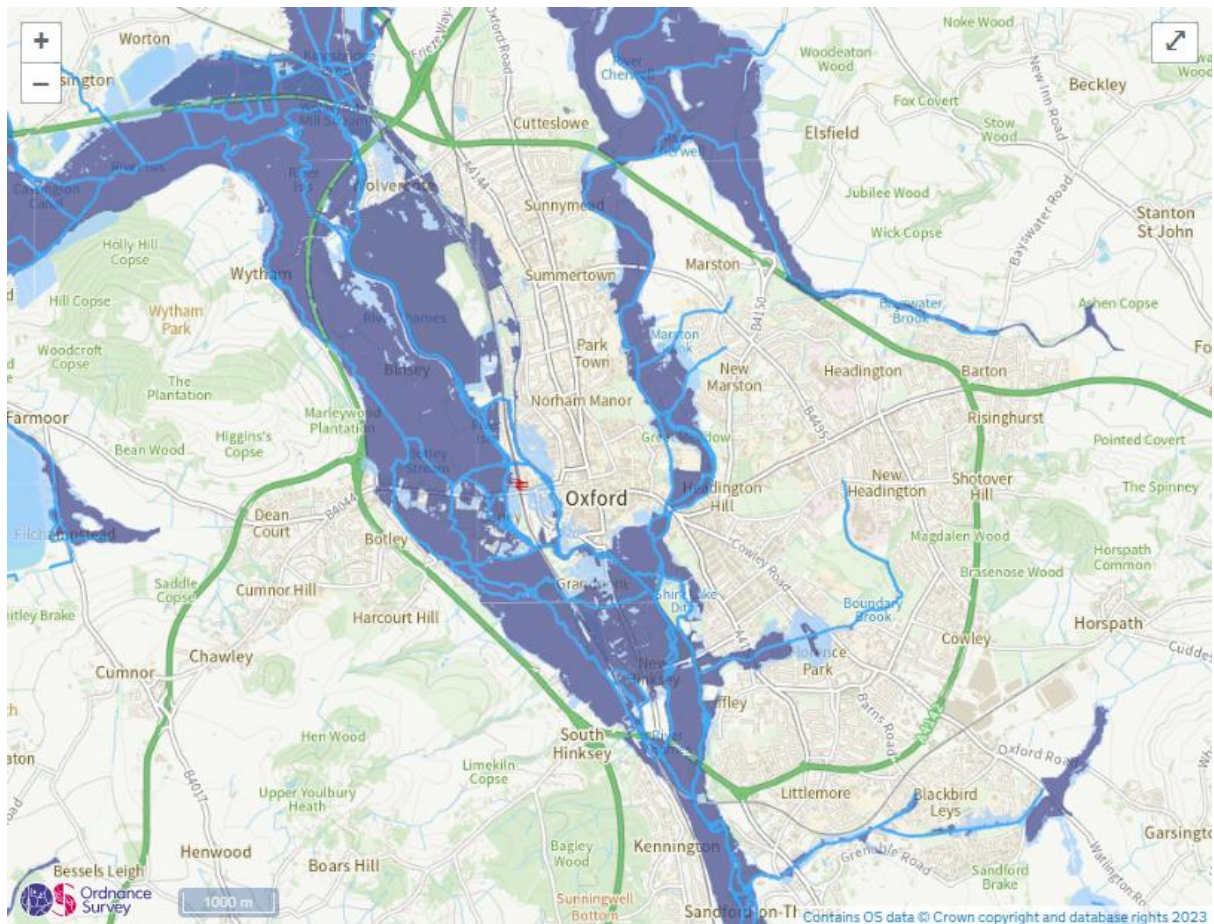


Figure 1: Flood map showing risk of river flooding in Oxford (Environment Agency, 2023)¹⁰

3.3 Some areas of flood risk in Oxford allow the river to naturally burst its banks onto river floodplain, however other areas have properties in them. According to the Thames Catchment Flood Management Plan, produced by the Environment Agency in 2009, Oxford has between 2,000 and 5,000 properties at risk from river flooding.

Groundwater Flooding

3.4 According to the Environment Agency¹¹, groundwater flooding:

“can happen when the level of water within rock or soil underground – known as the water table – rises. When the water table rises and reaches ground level, water starts to seep through the surface and flooding can happen. This means that water may rise up through floors or underground rooms such as cellars or basements.”

3.5 Groundwater flooding can occur in river valleys in locations with sand and gravel as the underlying geology. Oxford’s geology has some locations that fit this description and as such there is a risk of groundwater flooding in the city. There is a lack of local data with respect to groundwater flooding, however, the British Geological Survey (BGS) UK Geoviewer has been used to determine the bedrock across Oxford, with the Landis Soilscales map used to

¹⁰ <https://flood-map-for-planning.service.gov.uk/>

¹¹ <https://environmentagency.blog.gov.uk/2019/12/23/what-is-groundwater-flooding/>

determine the soils present. More detailed information about the bedrock and soils that are present within the city ¹²_[OBJ].

Surface Water Flooding

3.6 Surface water (or pluvial) flooding happens when heavy rainfall overwhelms local drainage capacity. It is a significant risk affecting around 3.2 million properties in England¹³. Surface water flooding is more difficult to forecast, with less warning time, than flooding from rivers as it is often caused by periods of intense rainfall. This is because “current meteorological methods are not able to pinpoint where or when potential intense rain will arrive, nor can they know or predict the capacity of local systems to manage the level of rainfall.”¹⁴ There are several high risk areas near the city centre where surface water pools, including large parts of St Aldates and Speedwell Street to the south of the city, and George Street to the west. Ground levels to the west and south of the city are lower than those in the city centre, which may explain why water is shown to pool in these locations¹⁵. The greatest risk of surface water flooding is around certain roads pertaining to the areas of Jericho, Headington, Summertown, Woodstock Road and the city centre. Recent surface water flood incidents have been reported at the following locations:

Area	Road	Year
Headington	Old Road	2020
Summertown	Summerhill Road	2020
Summertown	Water Eaton Road	2023
Woodstock Road	Blandon Close	2020

Figure 2: Recently recorded surface water flood incidents¹⁶

3.7 Most of the areas identified above tend to be located outside of the floodplains of the River Thames and River Cherwell, meaning that the main source of flooding shown in these areas is likely to originate from surface water flooding rather than from fluvial flooding.

Sewer Flooding

3.8 Sewer flooding is when sewage or foul water leaks from the sewerage system (through pipes, drains or manholes) or floods up through toilets, sinks or showers inside a building¹⁷. The responsible authority for sewer flooding across in Oxford is Thames Water, the sewerage undertaker, who have confirmed that a total of 155 historic records of sewer flooding have been recorded within the Oxford City administrative area since records

¹² Oxford City Level 1 Strategic Flood Risk Assessment, October 2023

¹³

https://assets.publishing.service.gov.uk/media/61dda076d3bf7f0551bd5f39/Surface_water_management_update.pdf

¹⁴ *ibid*

¹⁵ Oxford City Level 1 Strategic Flood Risk Assessment, October 2023

¹⁶ *ibid*

¹⁷ <https://researchbriefings.files.parliament.uk/documents/CBP-7839/CBP-7839.pdf>

began¹⁸. The most incidents have occurred in the built-up areas of New Hinksey, Grandpont, Botley, Osney and Marston¹⁹.

Strategic Flood Risk Assessment (SFRA)

3.9 The NPPF requires local plans to be supported by an SFRA and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities (in this case, Oxfordshire County Council). The most recent SFRA was undertaken in 2023 to support the emerging Oxford Local Plan 2040. A Level 1 SFRA was initially undertaken which identified all flood risk areas, based on all sources of flooding and taking account of the latest climate change projections. A Level 2 SFRA was then carried out as it was determined that the City Council could not allocate all land for development outside flood risk areas. The Level 2 SFRA gives more detail on the nature of the flood risks identified and where the sequential and exception tests will need to be applied. More information on how this has been applied can be found in the associated background paper (BGP9A – Flood Risk and Sequential Test of Sites). The Level 2 SFRA also identifies which sites will require a site-specific FRA.

Taking account of Climate Change impacts when looking at Flood Risk

3.10 An important part of predicting likely impact of flooding in the future is looking at the likely impacts of climate change. In flood risk terms, climate change is likely to bring increased wetter weather and more incidences of various types of flooding. The headline findings from the current UK Climate Projections released in 2018²⁰ (known as UKCP18) highlighted that in the most recent decade (2009-2018), the UK climate has been on average 1% wetter than 1981- 2010, and 5% wetter than 1961-1990. Looking into the future, UKCP18 reported that rainfall patterns across the UK will vary, but that by 2070, under a scenario of high greenhouse gas emissions, winters will on average grow increasingly wetter and summers drier. However, despite overall summer drying trends in the future, there are likely to be future increases in the intensity of heavy summer rainfall events, particularly for urban areas in the UK, which will have an impact on the frequency and severity of surface water flooding.

3.11 To take climate change into account in planning for flood risk, the SFRA has been informed by the latest guidance²¹ released by the Environment Agency on how local planning authorities, developers and their agents should use climate change allowances. There are allowances for different climate scenarios over different epochs, or periods of time, over the coming century.

3.12 For Oxford City, the peak river flow and peak rainfall intensity allowances are relevant and have been used in any relevant modelling updates. For peak river flow, Oxford falls within two management catchment areas: Gloucestershire and the Vale Management

¹⁸ Oxford City Level 1 Strategic Flood Risk Assessment, October 2023

¹⁹ *ibid*

²⁰ <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/summaries/headline-findings>

²¹ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Catchment and Cherwell and Ray Management Catchment. The climate change allowances for the Cherwell and Ray are significantly lower²² than those for the Gloucestershire and the Vale²³. The majority of the Oxford administrative area lies within the Gloucestershire and Vale Management Catchment, therefore this in combination with the more precautionary climate change allowances, is why this management catchment has been deemed to be the most appropriate one to use for Oxford. More detail on how the climate change allowances have been applied to the updated hydraulic modelling can be found in the Level 1 SFRA (2023)²⁴. In the emerging Oxford Local Plan 2040, we also looked at the implications of climate change on a site-specific basis as part of gaining a clear understanding about whether development proposed in higher-risk flood zones would be safe, as well as meeting the other tests set out in national policy. Climate change allowances were applied to all site allocations assessed as part of the Level 2 SFRA.

4. Feedback from consultation

4.1 At the Issues stage of consultation (2021), there were a wide variety of comments related to flooding, covering a broad range of issues and concerns and reflects the stage that the plan preparation had reached at that time. Some of the comments included concerns about the growing number of gardens that have been replaced with hardstanding resulting in increased run-off and localised flooding, and that nature-based solutions should assist with natural flood mitigation. Many comments received said that new development should not be built on the flood plain and that the economic and social costs of flooding to buildings are ignored and not taken into account when balancing the possible benefits of building on the flood plain or in flood prone areas. It was also noted that the degree of flooding we might expect with climate projections in the future has been underestimated.

4.2 The autumn 2022 Preferred Options Regulation 18 (Part 1) consultation explored these views in more detail. Many of the comments received related to not building on the flood plain or in zones that are at risk of flooding, particularly Flood Zone 3. Several comments were also in support of not reiterating national policy/ guidance in local policy. Comments were made from statutory consultees including Natural England who noted that the Preferred Options should consider surface water and ground water flooding. Thames Water wanted policies to refer to sewer flooding and an acceptance that flooding can occur away from the flood plain as a result of development where off-site sewerage infrastructure and capacity is not planned ahead of development. They also reiterated the importance of reducing the quantity of surface water entering the sewerage system, in order to maximise the capacity for foul sewage to reduce the risk of sewer flooding and the important role SuDS can play in this.

4.3 The Environment Agency submitted a number of comments, including:

- The need to have an up-to-date SFRA to support the new local plan, as well as undertaking a sequential test as soon as possible as this will impact the justification for and deliverability of the proposed site allocations.

²² <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow?mgmtcatid=3012>

²³ <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow?mgmtcatid=3038>

²⁴ Oxford City Level 1 Strategic Flood Risk Assessment, October 2023

- Some concern that there appears to be a focus on development within Flood Zone 3b within the Preferred Options, such as allowing increases in built footprint in these areas. Stress that Flood Zone 3b (which will need to be defined in the new SFRA) comprises land where water from rivers or the sea has to flow or be stored in times of flood and should therefore be safeguarded from built development in line with the PPG. Ideally, when a site in Flood Zone 3b is redeveloped, they recommend that flood risk is reduced, for example by raising floor levels to reduce risk to future occupants. They note that it is often not possible to provide level for level flood plain compensation for increased in built footprint in Flood Zone 3b, therefore they are not supportive of the option to allows increases in built footprint on brownfield sites in Flood Zone 3b, as these are likely to increase flood risk elsewhere.
- Note that since the last SFRA was published in 2017, there have been multiple updates to available data, information, planning policy and guidance that should be taken into account. One of these is a change to the starting point for defining Flood Zone 3b from 5% AEP to 3.3% AEP.
- Other key changes include a newer best available model to use in the area (Thames (Eynsham to Sandford) 2018 fluvial model) and that there are now more recent climate change revisions to consider.

4.4 Further comments were made in respect of the options sets. Some were supported including options a, c and d with aspects of e and g. Some revision to the wording in these options sets has also been provided²⁵. The Environment Agency were generally supportive of option a of the SuDS Policy Option Set (G8), where the SuDS features are biodiversity enhancing.

Feedback from colleagues in Development Management and Specialists discussions

4.5 A summary of any key feedback from Development Management and Specialists discussions was provided in the Preferred Options background paper²⁶, however a few of the key points included:

- More guidance for minor development should be incorporated into the policy as there are situations where objections are received but the application is approved because it's permitted or minor development.
- Definition of 'built footprint' requires more clarity together with the true intention of allowing development in Flood Zone 3b – idea was mainly to facilitate reuse of buildings, rather than more extensive redevelopment e.g. allowing buildings to be reorganised etc.
- Policy needs to be clearer on the requirement of what a safe access/egress is

²⁵

https://www.oxford.gov.uk/downloads/file/8454/preferred_options_regulation_18_part_1_consultation_report

²⁶ https://www.oxford.gov.uk/downloads/file/8133/bgp_9_flood_risk_and_drainage

- SuDS guidance needs to be made a little more robust – should try to give a better steer towards incorporating SuDS that are multi-functional, as opposed to relying on hard solutions like tanks under the ground wherever possible.

5. Likely trends without a new local plan

5.1 Flood risk from a range of sources will be an ongoing challenge in the city. Climate change is projected to bring about wetter winters and more incidences of high intensity rainfall events, which is likely to increase the risks of flooding, particularly in highly urbanised parts of the city and within the flood risk zones.

5.2 In the absence of a new local plan, local flooding policy would still be in place until 2036, as long as the plan remained “up-to-date”. In the absence of an up-to-date local plan, development management decisions would need to be made against the national framework. As the NPPF (at present) contains a strong policy framework at the national level for flooding, it is unlikely that new or existing development would be adversely impacted on by this change.

5.3 More locally, the Environment Agency is working in partnership on a major new scheme to reduce flood risk in Oxford. The Oxford Flood Alleviation Scheme (OFAS) will cost around £176 million and is one of the biggest flood schemes in the country, with the aim of reducing flood risk to homes, businesses, services and major transport routes into the city.²⁷ The OFAS will create a new stream with wetland wildlife corridor to the west of Oxford. The intention of the scheme is to reduce flood risk to all properties in Oxford currently at risk of flooding from the River Thames, as well as to the railway, Botley and Abingdon Roads, other local roads, utilities and services such as broadband. The scheme will also bring additional environmental improvements to the area, including creating new wetland which will link up existing wildlife sites. The proposed scheme is approximately 5 km long, starting just north of Botley Road and passing under the A423 Kennington Railway Bridge (Southern by-pass) to the south before re-joining the River Thames.

5.4 In spring 2022, the Environment Agency submitted a new planning application for the scheme to Oxfordshire County Council, who held a consultation on the proposals to allow the public to ask questions about the scheme. The Environment Agency has provided more information as requested by the County Council and is currently waiting for the County to organise a public consultation to their response. The Environment Agency has also made a new compulsory purchase order (CPO) for the scheme as they want to ensure that all the land and rights over the scheme are available. A public inquiry for the CPO starts on the 14 November 2023 and will run for around 5 weeks²⁸.

5.5 Although a scheme like the scale of OFAS has the potential to significantly reduce flood risk to all properties in Oxford currently at risk of flooding from the River Thames, even with

²⁷ <https://www.gov.uk/government/publications/oxford-flood-scheme/oxford-flood-scheme>

²⁸ *ibid*

flood defences in place, an element of residual risk will remain in areas that are prone to flooding. Residual risk can arise from the failure of flood management infrastructure such as a breach of a raised flood defence or blockage of a surface water conveyance system.

5.6 In respect of sustainable drainage systems (SuDS), the absence of a local plan could have some impact to smaller development. National policy is fairly silent on SuDS with the exception of requiring it on all major developments (unless there is clear evidence of it being inappropriate).²⁹ However, it is likely that this may change in 2024³⁰, after the Department for Environment, Food and Rural Affairs (DEFRA) recommended through its review for implementation of Schedule 3 to The Flood and Water Management Act 2010, that SuDS should be mandatory for all development³¹. The relevant policy in the current Oxford Local Plan 2036 (Policy RE4) contains a hierarchy of SuDS approaches to apply and refers applicants to the guidance provided by either the City Council (minor development) or County Council³² (major development). Without a new local plan, it is therefore minor schemes that could be affected as to date, SuDS is encouraged but is not mandatory on smaller schemes.

6. Approach to flood risk and SuDS in Local Plan 2040

6.1 The new policies have been informed by the updates previously referred to as well as consultation feedback, including discussions with the Environment Agency, with internal colleagues who specialise in flooding, and with those in the development management team, who have experience of applying the existing policies.

Review of Oxford Local Plan 2036 policies

6.2 The relevant policies in the existing Oxford Local Plan 2036 take a strong approach to managing flood risk in the city, and at the time of adoption, were in accordance with national policy and were informed by the SFRA (2017). It is recognised that since the last SFRA was published, there have been multiple updates to available data, information, planning policy and guidance that should inform the new SFRA, including updates to the relevant flood model and updated climate change allowances. One key change made in the national guidance in August 2022, is the change to the starting point for defining Flood Zone 3b, from 5% AEP (1 in 20) to 3.3 % AEP (1 in 30). These updates have all been incorporated into the new SFRA (2023).

Developing flood risk and SuDS policies for the new local plan

6.3 Nationally, there has been growing recognition of the need for adapting development to build resilience to flooding so that residents are able to recover more quickly and easily

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

³⁰ <https://www.gov.uk/government/news/new-approach-to-sustainable-drainage-set-to-reduce-flood-risk-and-clean-up-rivers>

³¹

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128073/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf

³² <https://www.oxfordshirefloodtoolkit.com/planning/surface-water-drainage/>

when it happens. The new Local Plan will need to continue to take a strong approach to managing flood risk in the city, whilst continuing to balance the need to deliver new development in a safe and resilient way that does not exacerbate flood risk elsewhere.

6.4 Addressing current and future flood risk remains a key priority for the new Local Plan. The ongoing impact of climate change include projected wetter winters and increased incidences of intense rainfall events is likely to exacerbate this risk in the future, with a variety of negative consequences for property, economy and ecosystems as well as human health. Although there is a need to strike a balance to ensure that other objectives such as the correct amount of housing, infrastructure etc. are also achieved, it is imperative that any new development is directed to areas with the lowest risk of flooding first.

6.5 Our existing policy is performing fairly well according to feedback from specialists and the Environment Agency. Our approach to flooding also benefits from national policy providing a strong framework for addressing flooding, much of which can be applied directly to Oxford. There are however some areas where relying on national policy alone is not appropriate, as it does not take account of the local circumstances of Oxford's flood risk context, particularly in relation to extensions. As the Local Plan 2036 policy has been put into use, some weaknesses and lack of clarity in how to apply the policy have also surfaced, which the Local Plan 2040 could address.

Approach to flood zone 3b (functional flood plain)

6.6 The city is highly constrained by areas of flood risk, with a significant area comprising flood zone 3 – this highest risk of flooding. Flood zone 3 includes an area that is functional flood plain, referred to as flood zone 3b. We would not usually accept development within this area due to the high risk of flooding along with the loss of flood storage that this would incur, and our proposed approach is to continue to follow national policy and set out that development of greenfield sites within 3b would not be permitted.

6.7 However, historic development has happened within the flood plain and has led to a number of areas of brownfield land existing within 3b. Current policy in the Local Plan 2036 was formulated recognising that these brownfield sites can provide more sustainable locations for development than greenfield sites and that refusing further development could allow these areas to deteriorate whilst ignoring the opportunities for thoughtful redevelopment that can actually reduce flood risk in future. Our proposed policy for the new Local Plan would broadly continue in this mindset and whilst limited development could be allowed, the built footprint of the site is not increased.

6.8 Early discussions took place with the Environment Agency to ascertain whether they were still comfortable with our approach of allowing development on brownfield land in Flood Zone 3b. The Environment Agency agreed that if the evidence base supports this approach, then this is something that can still be considered. However, like the current policy in the Oxford Local Plan 2036, this will only be supported in specific circumstances and will not be a carte blanche for all development - national policy will still need to be followed but there is some flexibility if the approach can be justified.

6.9 It is considered that the conditions that justified the bespoke approach to Flood Zone 3b in the Local Plan 2036 still very much remain, and therefore the approach is clearly still a justified and appropriate response to Oxford's situation, and overall the most sustainable approach. There are developed areas of Flood Zone 3b within Oxford already existing, many close to the city centre and station and in locations easily accessible by public transport, walking and cycling. Often, these were developed at a time where flood adaptation was less sophisticated. Preventing development of these sites is not necessarily beneficial overall. Key is ensuring that the potential for new, modern development to improve the flood risk situation is taken, ensuring the safety of occupants and ensuring that flood risk is not worsened elsewhere. With these conditions in place, there does not seem to be a need for a blanket approach that would prevent redevelopment on already developed sites in Flood Zone 3b. The aim of the policy therefore is to allow potential redevelopment of these sites, but with criteria to ensure that it is beneficial, and not harmful, in terms of flood risk.

Sustainable Drainage Systems (SuDS)

6.10 National Policy is fairly silent on SuDS, with the exception of requiring it on large developments. We feel that more detail can be added in the new Local Plan, especially in regard to the design of SuDS. In Oxford, a significant amount of development comes from minor planning applications, and we recognise that there is an opportunity to further help mitigate for flood risk by requiring SuDS on all new developments, including minor schemes. This could have a significant positive impact, especially if considering the potential cumulative effect that a lot of small developments could have on increasing overall flood risk in Oxford.

6.11 In addition to having SuDS on all new developments, we are also more explicit about encouraging green SuDS, that incorporate natural features, rather than grey (e.g. tanks underground). SuDS that incorporate natural green features have the benefit of bringing a wider range of additional benefits to place-making, such as making spaces for biodiversity and making spaces that are more pleasant for people. We therefore have drafted a policy that gives a hierarchical style approach to SuDS design incorporated, prioritising green SuDS and maximising multi-functionality.

Other issues the flood risk policy addresses

6.12 The policy has also included more detail and clarity on extensions, basement flats and culverting watercourses. Applications for extensions are a regular occurrence in the city and at present there can be a lack of clarity over what is expected on these types of applications to ensure that flood risk on a site is addressed satisfactorily. The new policy is proposing that planning applications for minor extensions proposed in Flood Zone 2 and 3a, will now need to be accompanied by a site-specific Flood Risk Assessment (FRA). We have also set out some key principles/ requirements within policy that will need to be met to address flood risk before these will be permitted. This should mean greater certainty as to what is expected.

6.13 Basement flats are also addressed and our stance is, that this type of self-contained accommodation comes with unacceptable levels of risk to occupants where they are proposed in an area of flood risk. As such, the policy makes clear that basement accommodation within Flood Zone 2 or 3 will not be permitted. This reinforces the

requirements of national policy and makes more explicit that self-contained basement flats will not be acceptable in areas at risk from fluvial flooding.

6.14 The policy also addresses culverting of open watercourses and sets out that this will not be accepted. Culverted watercourses can introduce additional flood risk in the local area due to the potential for throttling water flows during heavy rainfall events, as well as introducing additional risk of blockages during storm events that can exacerbate flooding. This approach would also help to preserve the natural features of our watercourses, which are important habitat and corridors for wildlife and people, and thus ties in with the approaches set out under the green infrastructure policies (protecting green and blue features across the city for the multi-functional benefits they bring).

7. Conclusions

7.1 This evidence summarised in this background paper illustrates how the draft policies relating to flood risk and SuDS have been formed. The final proposed text for Policy G7 (Flood risk and Flood Risk Assessments (FRAs)) and Policy G8 (Sustainable Drainage Systems (SuDS)) are presented in the boxes below:

Policy G7 – Flood risk and Flood Risk Assessments (FRAs)

Planning permission will only be granted where proposals have considered the potential for flooding from all sources now and for the lifetime of the development including climate change, as well as the potential for them increasing flood risk elsewhere, the safety of users of the development, and where they have appropriately addressed any flood risks identified.

Planning permission will only be granted where a sequential approach has been taken to locating the development and where the Sequential Test and the Exception Test (where necessary according to national policy and supporting guidance) have been passed.

Planning applications for development (including minor householder extensions and changes of use to houses in multiple occupation (HMOs)) must be accompanied by a Site-Specific Flood Risk Assessment (FRA) when proposed in the following locations:

- within Flood Zone 2,
- within Flood Zone 3,
- on sites within Flood Zone 1 larger than 1 ha,
- on sites within Flood Zone 1 of less than 1 ha but including a change of use in development type to a more vulnerable class,
- on sites within Flood Zone 1 in areas identified as Critical Drainage Areas.

The FRA must be undertaken in accordance with up-to-date flood data, national and local guidance on flooding and consider flooding from all sources including the impacts of climate change now and in the future.

Planning permission will only be granted where the FRA demonstrates that for the lifetime of the development and including the impacts of climate change:

- a) the proposed development will not increase flood risk offsite; and
- b) future occupants will be safe during times of flood; and
- c) safe access and egress in the event of a flood can be provided; and
- d) details of the necessary mitigation measures to be implemented have been provided.

For minor extensions (including householder) proposed within Flood Zone 2 and 3a, it is acknowledged it may be challenging to meet all the requirements above. Proposals will be expected to minimise risk to occupants and surrounding area by following the below hierarchy of principles in order of preference, demonstrating robust justification where the top levels in the hierarchy cannot be met:

- e) Full requirements of an FRA (as above)
- f) Finished floor levels above design flood level with compensation
- g) Finished floor levels above design flood level
- h) Finished floor levels at existing level with water exclusion

i) Finished floor levels at existing level with a water resilient strategy (unless the development cannot be made safe).

Planning permission will not be granted for development in Flood zone 3b (including minor household development) except where it is for water-compatible uses or essential infrastructure; or where it is on previously developed land and includes a high standard of mitigation designed to demonstrably decrease flood risk compared with the current situation. All the following criteria must also be met:

j) it will not lead to a net increase in the built footprint of the existing building within Flood Zone 3b and where possible lead to a decrease; and

k) it will not lead to a reduction in flood storage (using flood compensation measures) and where possible increase flood storage; and

l) it will not lead to an increased risk of flooding elsewhere; and

m) it will not put any future occupants of the development at risk, including in relation to ensuring safe access/egress.

Proposals for basement accommodation within flood zone 2 or 3 will not be permitted due to the unacceptable additional risks associated with this type of accommodation. Where proposals for basements are at risk of other sources of flooding (i.e., groundwater, surface water, or sewer flooding), it must be demonstrated that flood risk can be managed safely.

Applications that propose culverting of open watercourses will not be permitted.

Policy G8 – Sustainable Drainage Systems (SuDS)

All development proposals will be required where feasible to manage surface water through Sustainable Drainage Systems (SuDS).

SuDS must be designed in a way that incorporates reuse, infiltration, retention or conveyance methods which utilise natural, green and blue infrastructure rather than unnatural, artificial components. Below ground features such as pipe systems or underground attenuation tanks will not be permitted, unless exceptional site conditions justify an alternative approach which has been agreed with the Council. Multi-functionality of SuDS should be maximised in their design, such as where they are incorporated into public open space.

Where a site has potential for contamination, SuDS that rely on infiltration will be discouraged and other suitable methods should be adopted to protect the water environment unless it can be demonstrated that there will be no pathway of contamination.

Surface water runoff should be managed to greenfield run-off rates as close to its source as possible, in line with the following drainage hierarchy:

- a) store rainwater for later use; then:
- b) discharge into the ground (infiltration); then:
- c) discharge to a surface water body; then:
- d) discharge to a surface water sewer, highway drain or other drainage system; and finally:
- e) discharge to a combined sewer (only in exceptional circumstances).

Details of the SuDS must be submitted as part of a drainage strategy or FRA where required.

A SuDS maintenance plan must be submitted alongside any planning application for minor or major development, demonstrating how SuDS will be managed and remain effective for the lifetime of the development. The plan must clearly explain what maintenance measures will take place, how frequently they will occur and for how long and will be secured by condition.

For major developments, Oxfordshire County Council (as Lead Local Flood Authority) are a statutory consultee, and as such proposals will be expected to be adhere to their SuDS standards.

Developers must separate foul and surface water sewers on all new development. Where opportunities present during works on existing development, including householder extensions, applicants are encouraged to separate existing combined foul and surface water sewer arrangements.

A Foul and Surface Water Drainage Strategy must be provided for all new build residential development of 100 dwellings or more; non-residential development of 7,200sqm or more; or student accommodation of 250 study bedrooms or more, to demonstrate how foul water and surface water

drainage will be managed to reduce run off and improve water quality in line with national policy.